



Trans-Lake Washington Project

High Capacity Transit Modal Evaluation Initial Findings

Prepared for

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Office of Urban Mobility**

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TABLE OF CONTENTS

1. INITIAL FINDINGS	1-2
1.1 PURPOSE OF THE HIGH CAPACITY TRANSIT MODAL EVALUATION	1-2
1.2 TRANSPORTATION EFFECTIVENESS	1-10
1.3 ENVIRONMENTAL IMPACTS	1-14
1.4 SUMMARY OF COST FINDINGS	1-18
1.5 CONCLUSIONS	1-20
1.6 RECOMMENDATIONS	1-22



1. INITIAL FINDINGS

1.1 PURPOSE OF THE HIGH CAPACITY TRANSIT MODAL EVALUATION

This initial findings paper reviews preliminary transportation, environmental, and cost evaluation information for the High Capacity Transit (HCT) alternatives being considered by the Trans-Lake Washington Project. The overall alternatives analysis process is illustrated in Figure 1-1. The evaluation is being conducted to identify and test possible route and operating scenarios on the three major alternative corridors identified in the project's first level screening conducted in October 2000:

- Alternative C1: HCT in the SR 520 Corridor
- Alternative C2: HCT in the I-90 Corridor
- Alternative C3: HCT in the Mid-Lake Corridor

A final modal evaluation will be completed in April 2001. The report will provide more details on the potential effect of design, route, or operating options for HCT on these routes. When the information is completely assembled, some of the findings may change. However, the information developed to date has helped the project team identify the most reasonable and representative definitions of HCT for the above three corridors.

1.1.1 Alternatives Considered

The primary decision to be made for HCT is which of the three corridors should be used for a crossing of Lake Washington. Regardless of the lake-crossing alternative chosen, a variety of route options would remain available on each side of the lake to connect locations within Seattle and between Bellevue, Redmond, Kirkland, or Issaquah. The approach of the project team was to define alternatives that would illustrate how major route options on each side of the Lake would affect transportation performance, environmental impacts, and costs for the three main corridor alternatives.

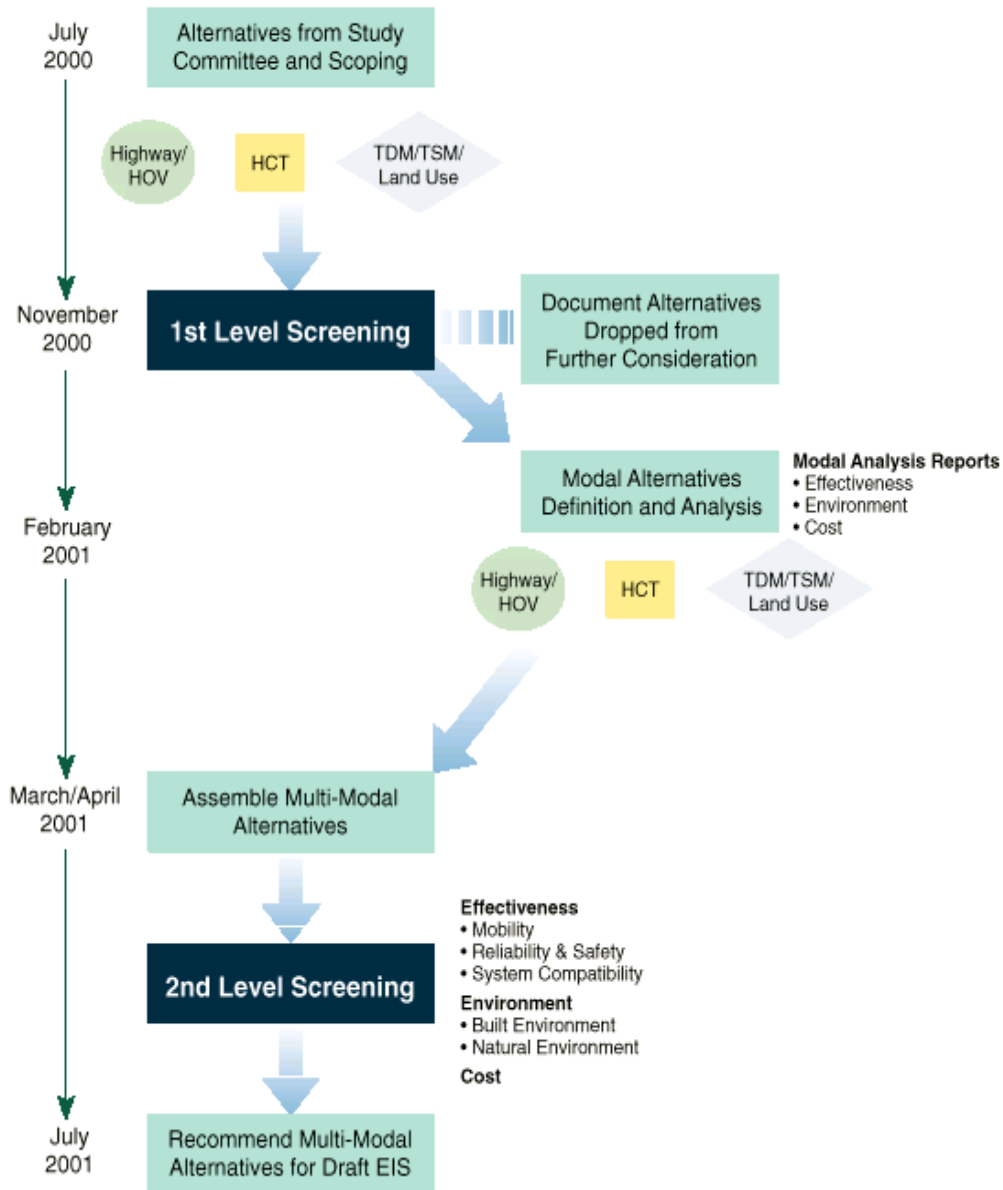
The sub-alternatives involved two technology options, as well as different route segment and operating combinations. The technology options are discussed below.

Fixed-Guideway

Sound Transit's ongoing Alternative Transit Technology Assessment will identify candidate technologies for Trans-Lake, but these alternatives are assumed to require continuous fixed-guideway facilities for the length of the route. Although the fixed-guideways would not necessarily be rail facilities, they were assumed to involve similar characteristics of access, right-of-way, profile, station footprints, operations, and costs.



Figure 1-1 Alternatives Evaluation and Screening Process



Bus Rapid Transit

For the purposes of modal evaluation, a bus rapid transit (BRT) system was assumed to have an exclusive right-of-way busway on or adjacent to the SR 520 corridor, with direct connections to stations and transfer centers. A BRT system would also have the flexibility to allow vehicles to operate on surface streets or freeway HOV facilities.

High Capacity Transit Route Alternatives

The representative sub-alternatives developed for each lake crossing are summarized below and illustrated in Figures 1-2 through 1-6.¹ More detailed descriptions of the different route and operating combinations tested are provided at the end of this chapter.¹

C1.1: Fixed-Guideway in the SR 520 Corridor

On the Eastside, two of the fixed-guideway alternatives provide a direct connection from Redmond/Overlake to Seattle with branch lines to Bellevue and Kirkland (included in alternatives C1.1c and C1.1d). The other two alternatives routed all service through downtown Bellevue via a tunnel under Clyde Hill (included in Alternative C1.1a and C1.1b).

In Seattle, one alternative would follow the SR 520 corridor to I-5 and then travel through South Lake Union to the Westlake station in downtown Seattle (included in Alternative C1.1a). The other alternatives would turn north of the SR 520 corridor and provide direct service to the University District/Wallingford/Fremont (included in Alternative C1.1b and C1.1c) or Ballard neighborhoods (included in Alternative C1.1d) before turning south to the Seattle Center/South Lake Union and Westlake.

C1.2: Bus Rapid Transit in the SR 520 Corridor

On the Eastside the BRT alternatives provide a busway facility on or adjacent to the SR 520 corridor with direct connections to Bellevue, Kirkland, and Redmond.

Two bus service scenarios were developed for this evaluation, which affected busway connections in Seattle.

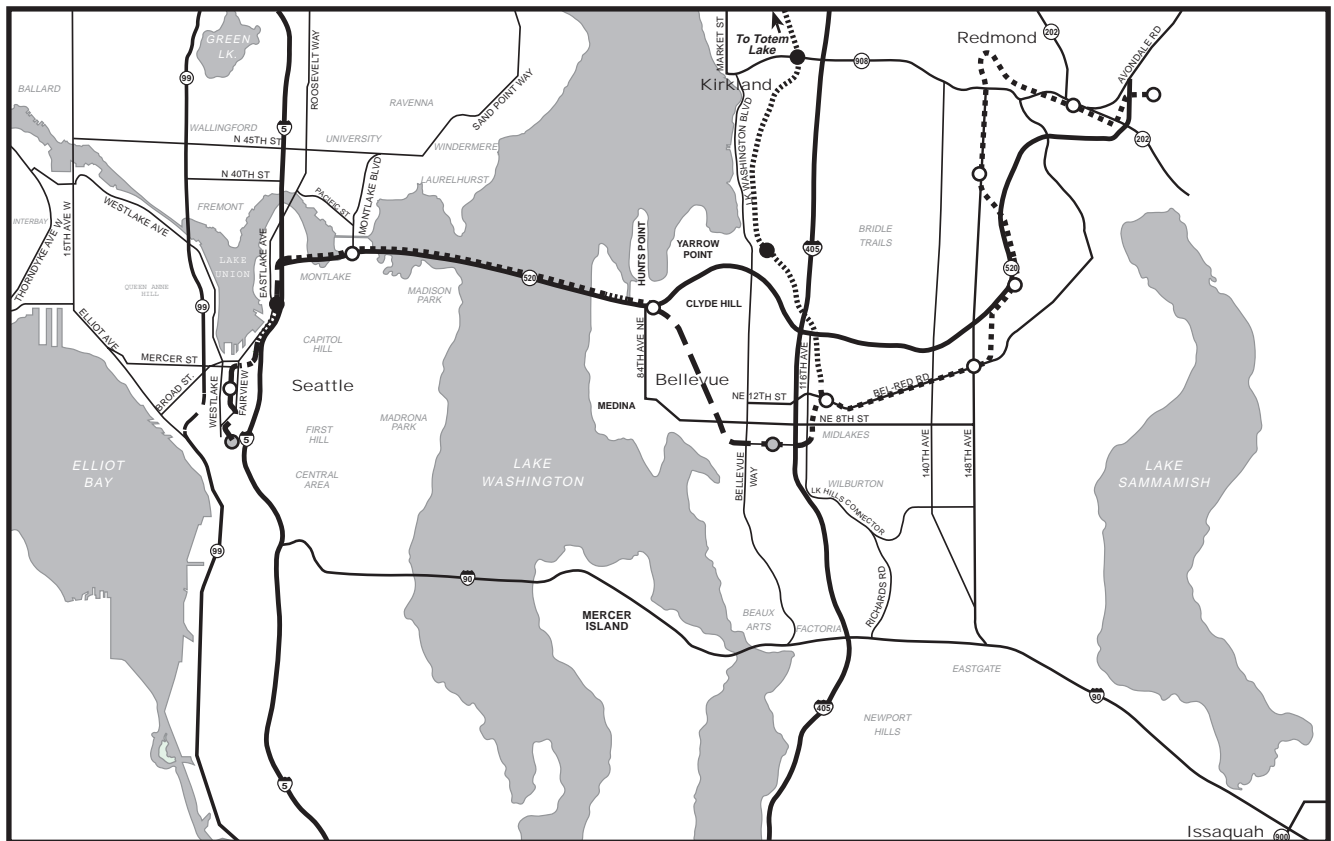
- Radial bus service on the Eastside with intercepts at Seattle light rail stations, provided direct connections to either the Pacific Station (Alternative C1.2a: SR 520 BRT, Pacific Street Intercept), or to the Westlake Station via a South Lake Union busway (Alternative C1.2b: SR 520 BRT, Westlake Intercept)
- Trunk/feeder bus service on the Eastside with direct routing through downtown Seattle via a South Lake Union busway (Alternative C1.2c: SR 520 BRT, Direct Routing through downtown Seattle)

C2: Fixed-Guideway Transit in the I-90 Corridor

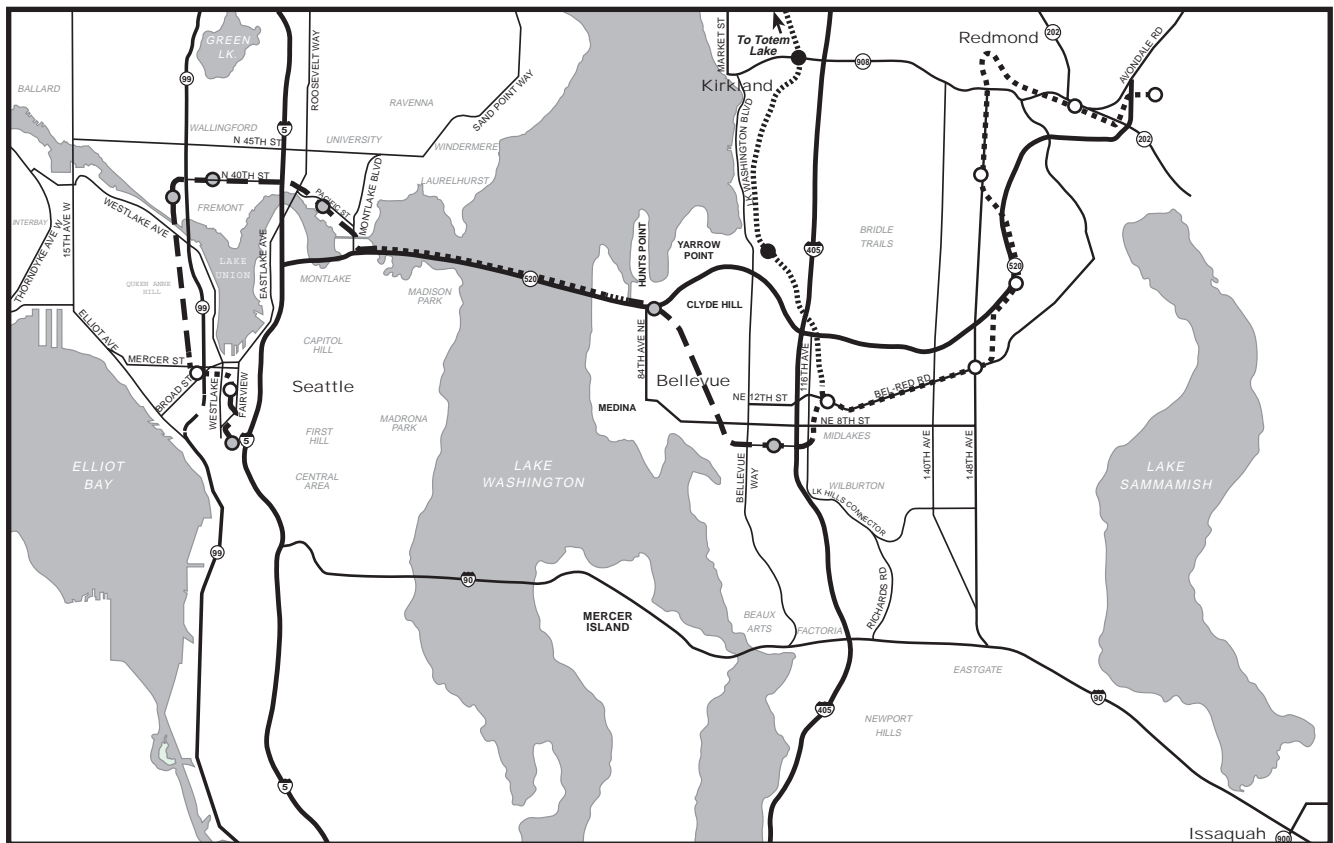
Both I-90 fixed-guideway alternatives use the D-2 roadway from the downtown Seattle transit tunnel to the I-90 center roadway across Lake Washington.

¹ A Preliminary Detailed Definition of High Capacity Transit Alternatives Report was prepared in February 2001. The report includes segment level mapping of improvements and a narrative description of alternative features and analysis assumptions. The report is available for review at the Trans-Lake Washington Project Offices at Sound Transit.





**Alternative C1.1a: SR 520 Fixed Guideway
Downtown Seattle-Bellevue-Kirkland/Redmond**



**Alternative C1.1b: SR 520 Fixed Guideway
Downtown Seattle-U District-Bellevue-
Kirkland/Redmond**



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Alignment

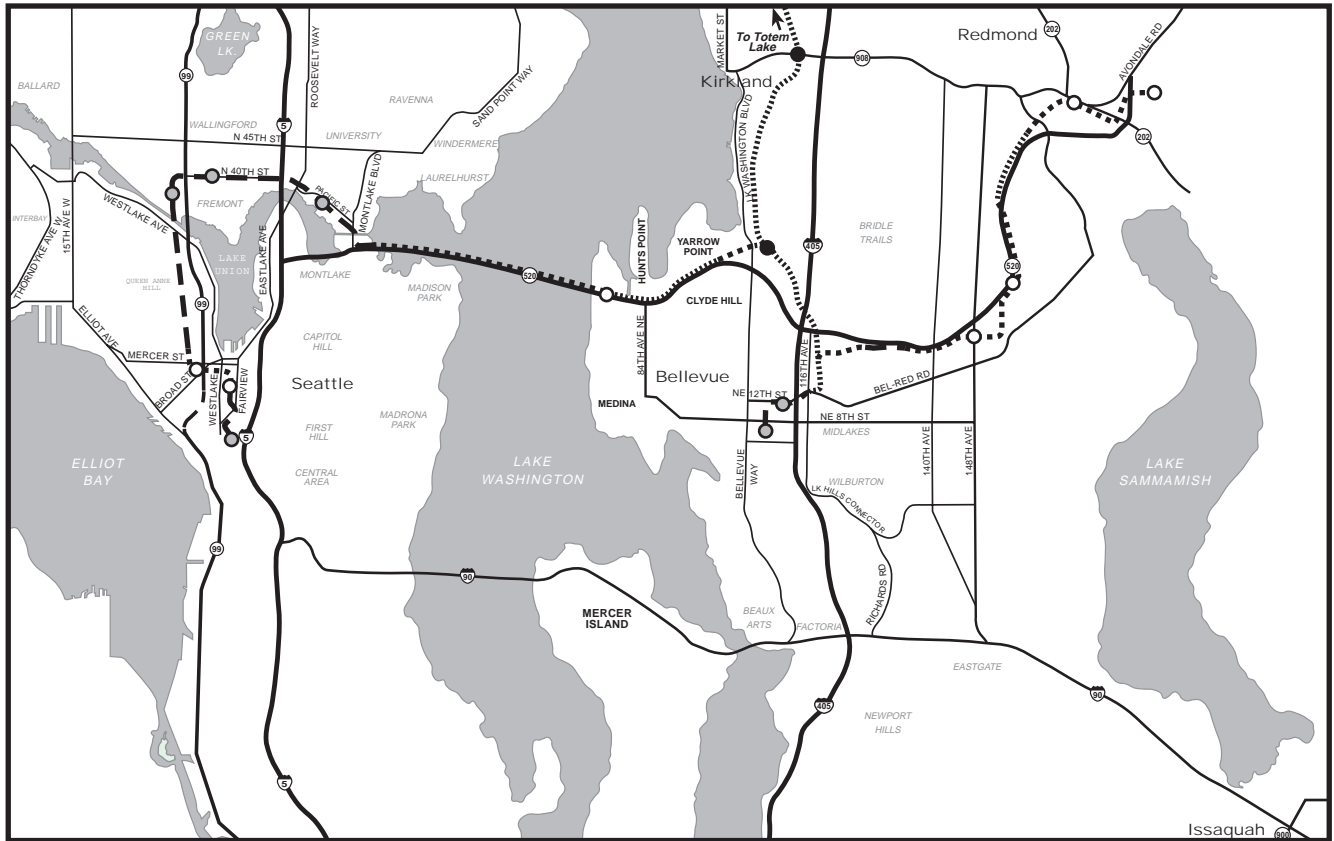
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- Subway
- At Grade

Station

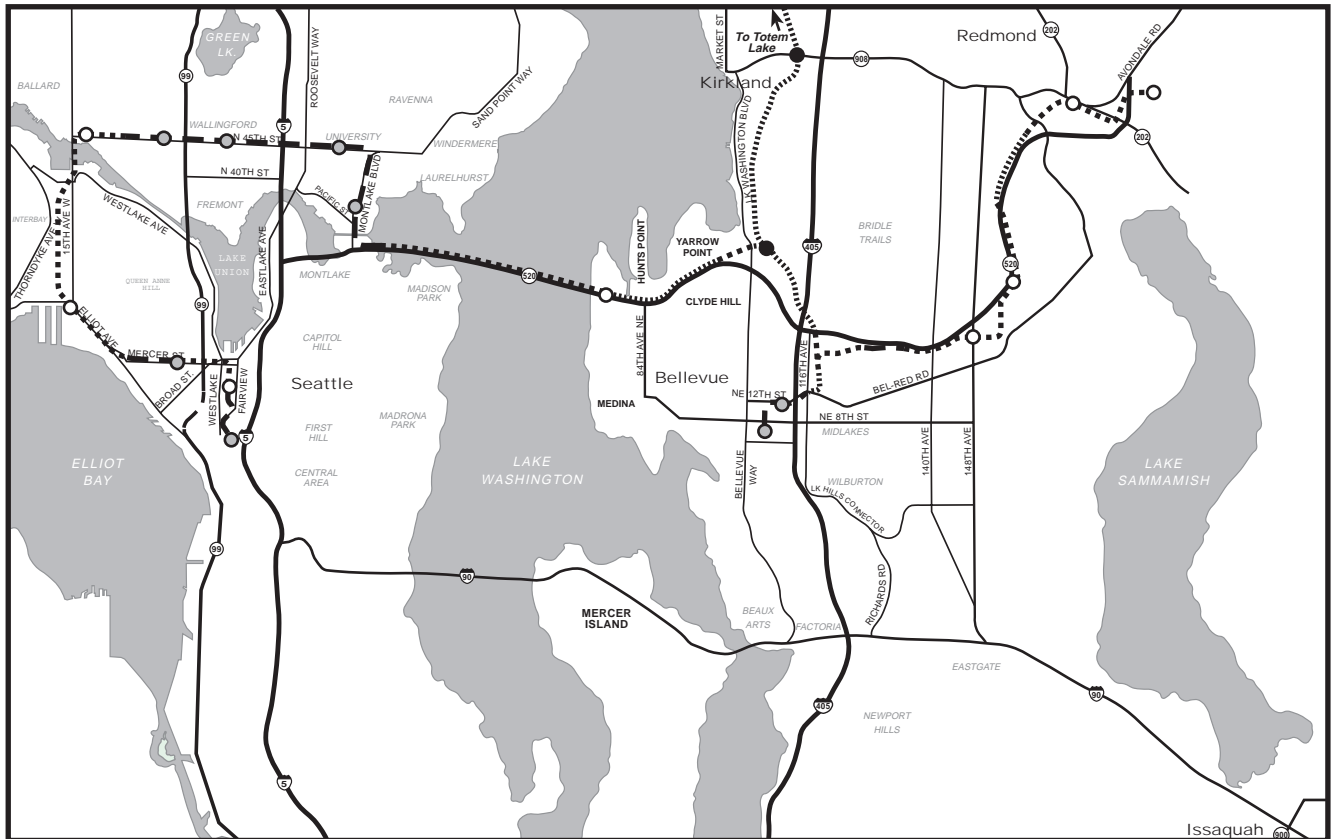
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Note: Short transition sections not shown

Figure 1-2



**Alternative C1.1c: SR 520 Fixed Guideway
Downtown Seattle-U District-Kirkland/Redmond/Bellevue**



**Alternative C1.1d: SR 520 Fixed Guideway
Downtown Seattle-U District-Kirkland/Redmond/Bellevue**



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Alignment

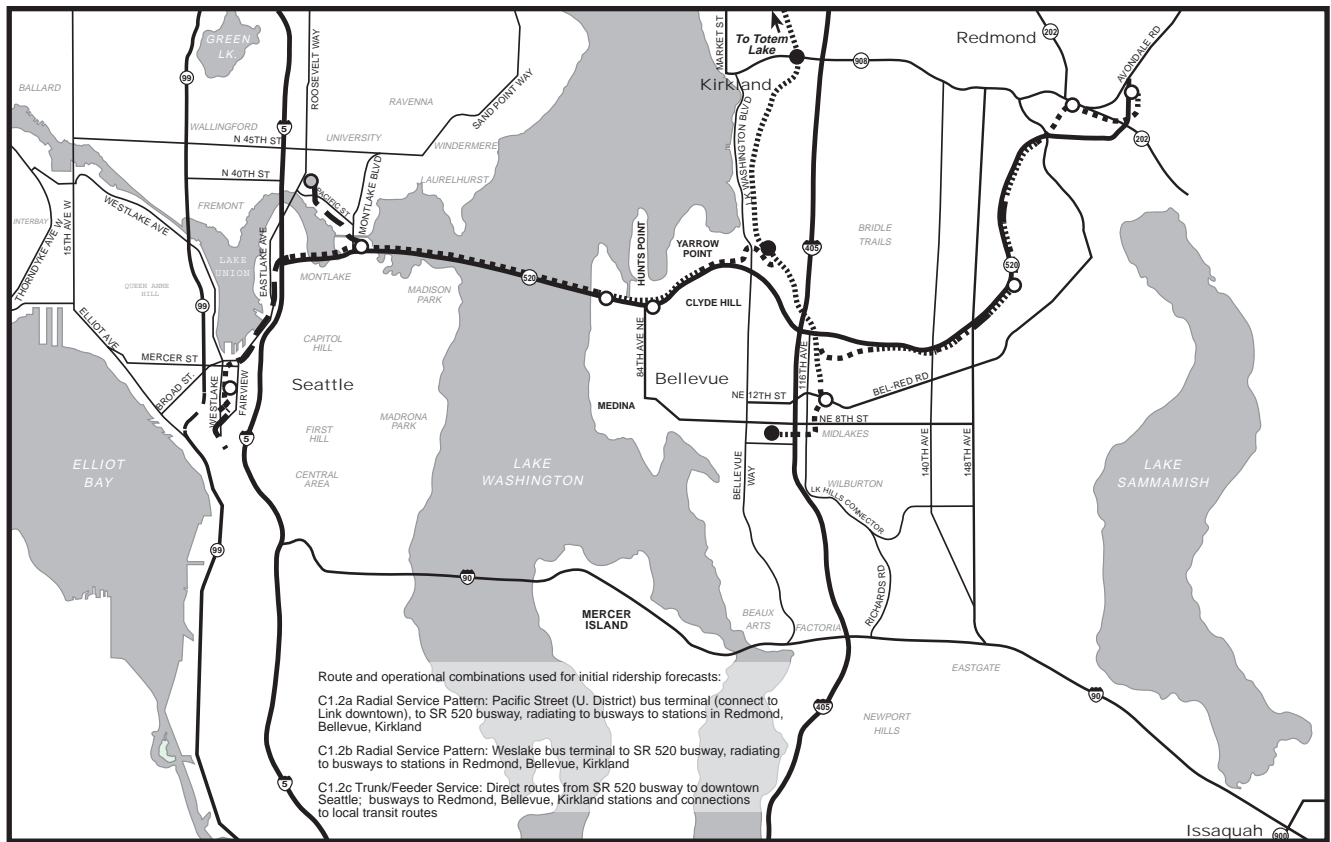
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Note: Short transition sections not shown

Figure 1-3



**Alternatives C1.2a, C1.2b and C1.2c:
SR 520 Bus Rapid Transit Route Options**



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Alignment

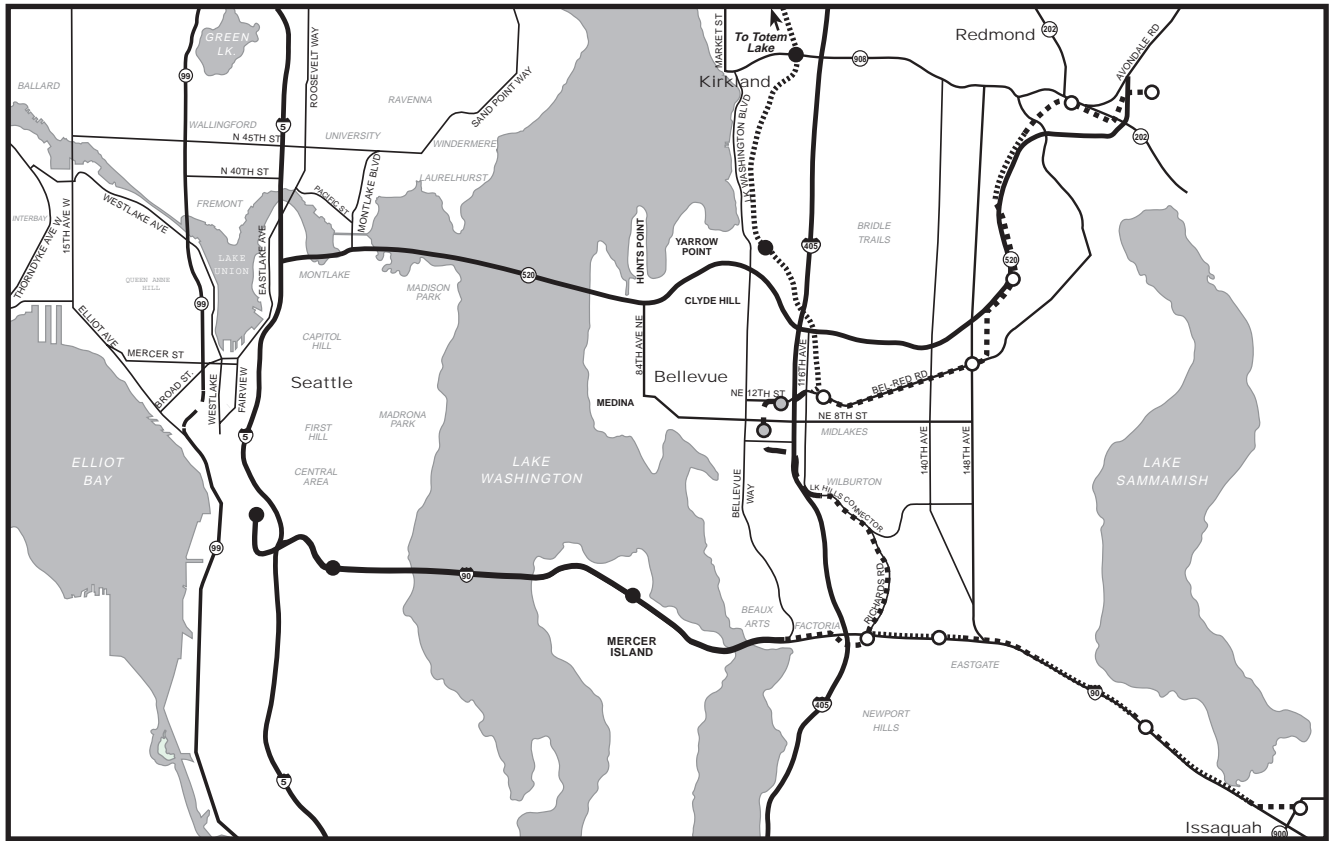
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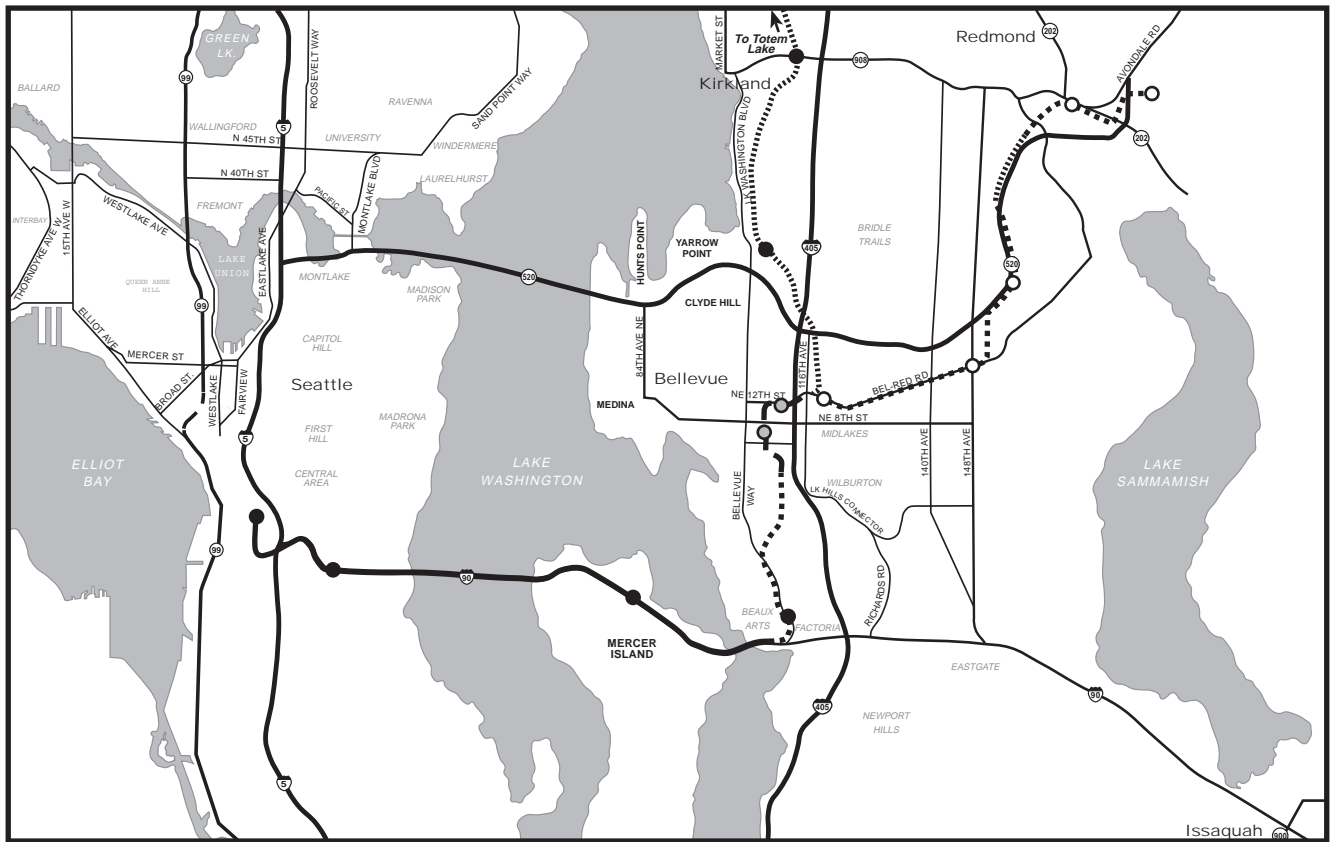
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Note: Short transition sections not shown

Figure 1-4



**Alternative C2.1a: I-90 Fixed Guideway
Downtown Seattle-Factoria-Issaquah/Bellevue-Kirkland/Redmond**



**Alternative C2.1b: I-90 Fixed Guideway
Downtown Seattle-Bellevue-Kirkland/Redmond**



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Alignment

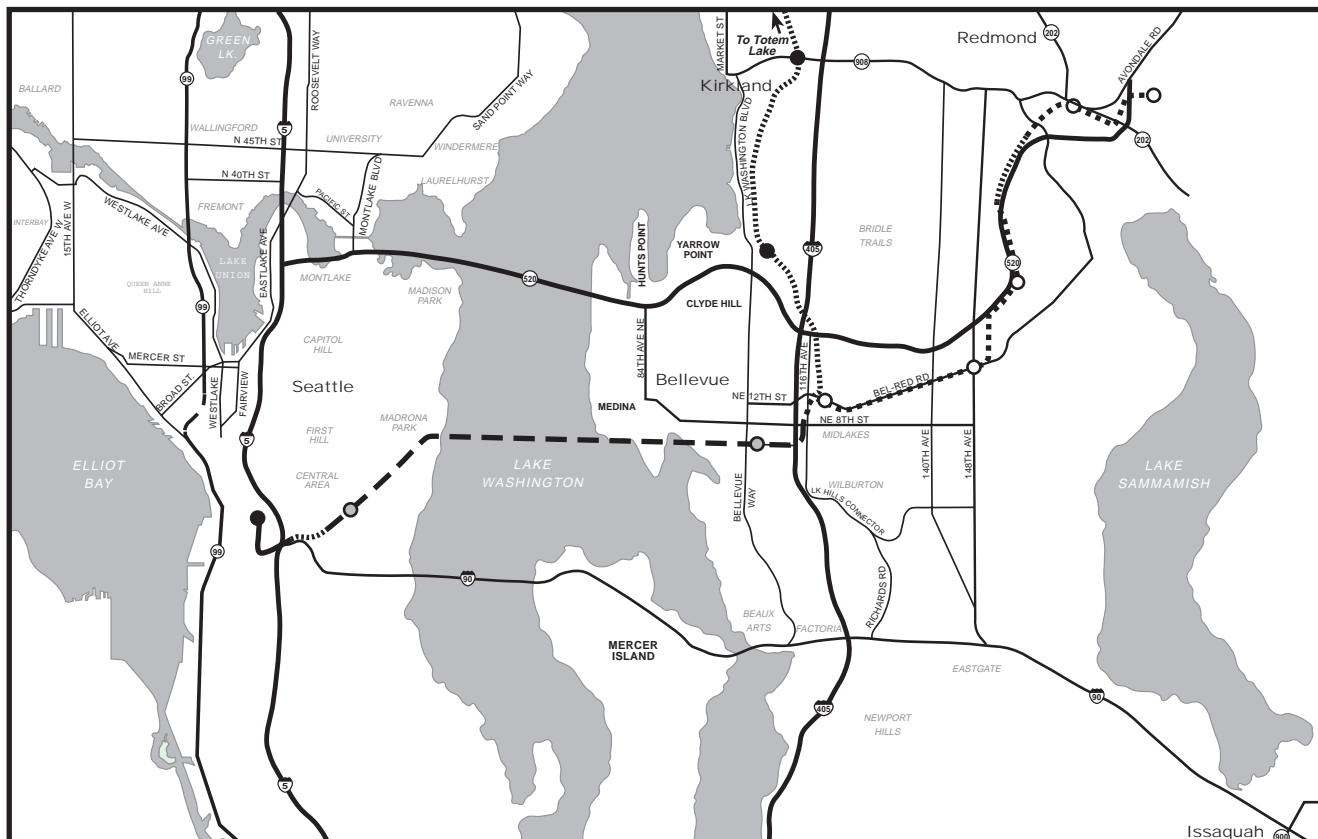
- Aerial
- Subway
- At Grade

Station

-
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Note: Short transition sections not shown

Figure 1-5



On the Eastside, both alternatives provide direct connections to Mercer Island, Bellevue, Redmond, and Kirkland. One alternative connects to downtown Bellevue via Factoria and also includes a connection to Issaquah (Alternative C2.1a). The second alternative connects to downtown Bellevue via the S. Bellevue park-and-ride lot and 112th Avenue SE and does not include an Issaquah connection (Alternative C2.1b).

C3: Mid-Lake Fixed-Guideway

On the Eastside, the Mid-Lake fixed-guideway alternatives provide connections to Bellevue, Redmond, and Kirkland. The lake crossing would be in either a submerged floating tunnel or a bored tunnel under the lake bottom. In Seattle, the alternative would connect to the downtown transit tunnel via a tunnel under the Central District.

1.2 TRANSPORTATION EFFECTIVENESS

The transit ridership forecasts for the HCT alternatives were developed based on a regional model, with predictions for ridership for HCT on I-90 or SR 520, for all Trans-Lake (SR 520, I-90, and SR 522), and for the region. The most useful forecasts tended to be the daily and peak-period transit ridership levels. These forecasts helped identify the major transportation differences between the initial HCT alternatives. Travel times, a key factor affecting transit ridership, was also reviewed. Other criteria, including transit boardings by segment and total daily transit trips, were also developed and are discussed in more detail in Chapter 2. Transit ridership estimates were developed using the Sound Transit forecasting model, with summary results shown in Table 1-1.

Table 1-1. 2020 Trans-Lake Screenline Volumes and HCT Boardings

	Trans-Lake Screenline		Trans-Lake HCT Daily Boardings
	Peak-Period	Daily	Daily
No-Action	15,000	40,000	N/A
C1: Fixed-Guideway HCT in SR 520	18,000-20,000	51,000-55,000	50,000-100,000
C1: Busway HCT in SR 520	21,000	54,000-55,000	47,000-53,000
C2: HCT on I-90	17,000-20,000	46,000-52,000	51,000
C3: HCT Mid-Lake	21,000	49,000	44,000



Overall, total transit ridership across the lake remained relatively consistent among all the alternatives. Total ridership across the lake ranged from 17,000 to 21,000 PM peak-period riders, and from 46,000 to 54,000 riders daily. These transit ridership estimates include Fixed-Guideway, BRT, and other bus transit ridership that would occur across the Lake in each alternative on Trans-Lake corridors (I-90, SR 520, and SR 522).

Daily HCT boardings were much higher with SR 520 fixed-guideway alternatives which include service to the University District/Wallingford/Fremont or Ballard and the Seattle Center/South Lake Union. This higher ridership results from additional service to intra-Seattle transit markets, but appears to have only a modest effect on ridership across the Lake.

Total high capacity transit ridership within the Eastside varied very little across the alternatives, due to the fact that all alternatives included service to the core Eastside transit markets of Bellevue, Kirkland, and Redmond.

The forecast results by alternative are shown in Tables 1-2a and 1-2b. An initial review of ridership forecasts by corridor is described below.

C1: SR 520 Fixed-Guideway

The SR 520 Fixed-Guideway Alternative C1.1b (all service routed through Bellevue on the Eastside and service to the University District/Wallingford/Fremont en route to the Seattle Center and Westlake) had the highest ridership across Lake Washington. However, all the C1 SR 520 alternatives were within 10 percent of each other for the corridor and for all Trans-Lake.

The alternatives with direct service to the University District/Wallingford/Fremont (included in Alternative C1.1b and C1.1c) or Ballard neighborhoods (included in Alternative C1.1d) and the Seattle Center had up to twice the daily high capacity transit ridership of the routes following the SR 520 corridor direct to downtown Seattle. This higher ridership results from additional service to intra-Seattle transit markets, but appears to have only a modest effect on ridership across the Lake.

C1: SR 520 Bus Rapid Transit

Both BRT service concepts – radial service with intercepts at Seattle light rail stations or Eastside trunk/feeder service with direct routing through downtown Seattle – had very similar ridership.

The BRT Alternative C1.2a (Pacific Street Intercept) had the highest peak ridership across Lake Washington. Its higher peak-period ridership resulted primarily from increased transit ridership to Eastside employment. By bringing all SR 520 bus service to the Pacific Street light rail station in a busway, rather than splitting bus routes between downtown Seattle and the University District, this alternative increased the frequency of service to central and north Seattle residents traveling east.



Table 1-2a. 2020 Daily and Peak-Period Transit Volumes at Trans-Lake Screenline*

Alternative	Trans-Lake Screenline All Transit Riders		Trans-Lake HCT Daily Boardings
	PM Peak (3-hour period)	Daily	Daily
<i>No Action</i>	15,500	39,700	--
C1: SR 520 Fixed-Guideway			
Alternative C1.1a: SR 520 Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	18,700	50,700	50,000
Alternative C1.1b: SR 520 Fixed-Guideway, Downtown Seattle – U District – Bellevue – Kirkland/Redmond	20,300	55,300	81,000
Alternative C1.1c: SR 520 Fixed-Guideway, Downtown Seattle – U District – Kirkland/Redmond/Bellevue	18,900	51,000	86,000
Alternative C1.1d: SR 520 Fixed-Guideway, Downtown Seattle – Ballard – U District – Kirkland/Redmond/Bellevue	18,500	51,000	100,000
C1: SR 520 Bus Rapid Transit			
Alternative C1.2a: SR 520 BRT, Radial Service Pattern, Pacific Street Intercept	21,500	55,200	47,000
Alternative C1.2b: SR 520 BRT, Radial Service Pattern, Westlake Intercept	20,600	53,500	50,000
Alternative C1.2c: SR 520 BRT, Trunk/Feeder Service Pattern, Direct Routing through Downtown Seattle	20,700	54,300	53,000
C2: I-90 Fixed-Guideway			
Alternative C2.1a: I-90 Fixed-Guideway, Downtown Seattle – Factoria – Issaquah/Bellevue – Kirkland/Redmond	16,800	45,500	51,000
Alternative C2.1b: I-90 Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	19,600	51,500	51,000
C3: Mid-Lake Fixed-Guideway			
Alternative C3.1a: Mid-Lake Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	20,800	48,500	44,000

* The Trans-Lake Screenline is a North/South line bisecting I-90, SR 520, a mid-Lake corridor, and SR 522.



Table 1-2b. Average Travel Time Comparisons

Alternative	Seattle to Bellevue (University St. Station to Bellevue Station)	Seattle to Redmond (Westlake Station to Bear Creek Station)	University District to Kirkland
C1: SR 520 Fixed-Guideway			
Alternative C1.1a: SR 520 Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	20 min.	34 min	35 min
Alternative C1.1b: SR 520 Fixed-Guideway, Downtown Seattle – U District – Bellevue – Kirkland/Redmond	24 min.	38 min	18 min
Alternative C1.1c: SR 520 Fixed-Guideway, Downtown Seattle – U District – Kirkland/Redmond/Bellevue	29 min	34 min	14 min
Alternative C1.1d: SR 520 Fixed-Guideway, Downtown Seattle – Ballard – U District – Kirkland/Redmond/Bellevue	36 min	41 min	15 min
C1: SR 520 Bus Rapid Transit			
Alternative C1.2a: SR 520 BRT, Radial Service Pattern, Pacific Street Intercept	26 min	34 min	14 min
Alternative C1.2b: SR 520 BRT, Radial Service Pattern, Westlake Intercept	24 min	28 min	17 min
Alternative C1.2c: SR 520 BRT, Trunk/Feeder Service Pattern, Direct Routing through Downtown Seattle	25 min	30 min	17 min
C2: I-90 Fixed-Guideway			
Alternative C2.1a: I-90 Fixed-Guideway, Downtown Seattle – Factoria – Issaquah/Bellevue – Kirkland/Redmond	23 min	40 min	45 min
Alternative C2.1b: I-90 Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	20 min	36 min	38 min
C3: Mid-Lake Fixed-Guideway			
Alternative C3.1a: Mid-Lake Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	14 min	29 min	32 min

C2: I-90 Fixed-Guideway

The I-90 Fixed-Guideway Alternative C2.1b with direct service to downtown Bellevue via S. 112th had higher ridership than the alternative traveling to downtown via Factoria (Alternative C2.1a). The faster connection to downtown Bellevue, Kirkland and Redmond increased total peak ridership across Lake Washington by more than 15 percent and more than offset daily HCT ridership lost by not directly serving Factoria and Issaquah.



C3: Mid-Lake Fixed-Guideway

The Mid-Lake corridor route carried a higher percentage of Trans-Lake ridership as the I-90 and SR 520 corridor alternatives, but it did not appear to offer significantly better total ridership results at either a corridor or total system level.

1.3 ENVIRONMENTAL IMPACTS

Below is a discussion about the relative differences in environmental impacts potentially caused by each of the ten HCT alternatives. Although the alternatives have been analyzed using all the environmental criteria agreed to for screening, this summary focuses on the issues that both differentiate the alternatives and would cause considerable risk to permitting if avoidance techniques are not used in the next phase of design. These criteria are shown in summary form in Table 1-3, with resources shown on Figure 1-7.

The federal laws which are of particular concern are Section 4(f) of the Department of Transportation Act of 1966, Section 106 of the National Historic Preservation Act, the Endangered Species Act, and Section 404 of the Clean Water Act. Under Section 4(f), transportation projects that adversely affect park and recreational lands, wildlife and waterfowl refuges, and historic sites cannot be approved by the Secretary of Transportation unless a determination is made that there is no feasible and prudent alternative, and that all possible planning has been done to minimize harm. Section 106 protects significant historic, archeological, cultural and tribal resources. Tribal resources include fish and shellfish in designated tribal usual and accustomed fishing areas. The Endangered Species Act and the 4(d) rule for chinook salmon make it illegal to “take” a fish listed as threatened; take includes adversely impacting fish habitat. Section 404 of the Clean Water Act requires a USCOE permit when locating a structure or fill materials in navigable waters.

C1: SR 520 Crossing Alternatives

Of the SR 520 crossing alternatives, all would likely directly impact either four or five parks. Alternatives C1.1b and C1.2a would directly impact the fewest parks by impacting four parks each. Impacts to parks would raise Section 4(f) issues for each park and would only be permitted if no other feasible or prudent alternatives were available. Design modifications and alternatives refinement could likely either avoid or minimize impacts to some of the parklands. Of particular concern is the Montlake area, where the Washington Park and Arboretum surrounds SR 520, making it impossible to avoid impacts to that park.

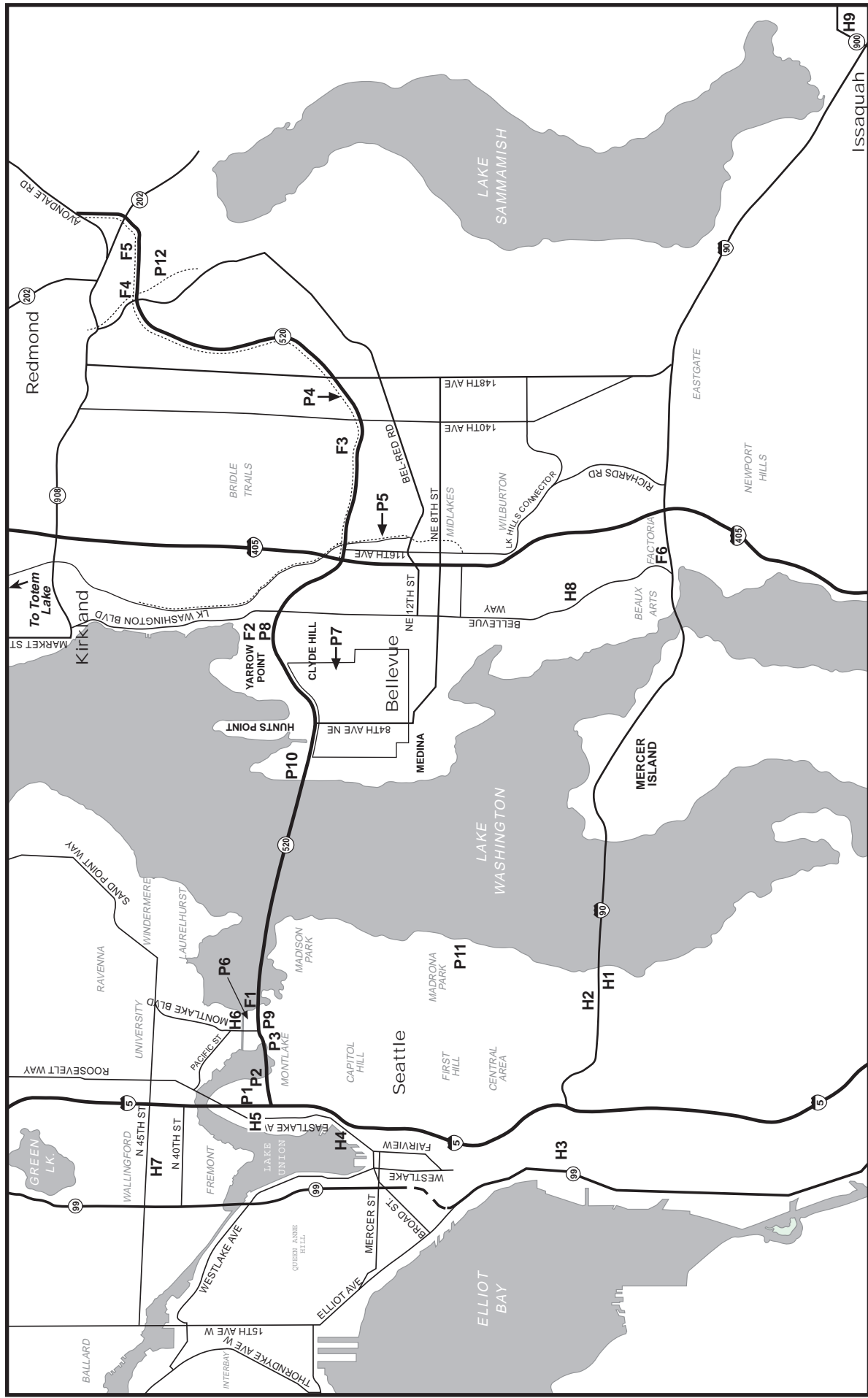
Four of the alternatives (C1.1a, C1.1d, C1.2b, and C1.2c) could impact one of two historic properties each (either the Lake Union Steam Plant and Hydro House [Zymogenetics] or a historic property located along 45th Street N.). It is likely that design modifications and alternatives refinement could avoid the impact to either historic property. However, if impacts to historic properties could not be avoided, Section 106 and Section 4(f) would apply to the historic properties. Impacts to the Section 4(f) historic properties would only be permitted if no other feasible and prudent alternatives were available.



**Table 1–3. Summary of Key Environmental Impacts by Alternative
(Number of Resources Potentially Affected)**

Alternative	Parks and Trails Section 4(f)	Historic Properties Section 4(f) and Section 106	Fish-bearing Streams and Wetlands ESA and Section 404
C1: SR 520 Fixed-Guideway			
Alternative C1.1a: SR 520 Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	5	1	3
Alternative C1.1b: SR 520 Fixed-Guideway, Downtown Seattle – U District – Bellevue – Kirkland/Redmond	4	0	3
Alternative C1.1c: SR 520 Fixed-Guideway, Downtown Seattle – U District – Kirkland/Redmond/Bellevue	5	0	5
Alternative C1.1d: SR 520 Fixed-Guideway, Downtown Seattle – Ballard – U District – Kirkland/Redmond/Bellevue	5	1	5
C1: SR 520 Bus Rapid Transit			
Alternative C1.2a: SR 520 BRT, Radial Service Pattern, Pacific Street Intercept	4	0	5
Alternative C1.2b: SR 520 BRT, Radial Service Pattern, Westlake Intercept	5	1	5
Alternative C1.2c: SR 520 BRT, Trunk/Feeder Service Pattern, Direct Routing through Downtown Seattle	5	1	5
C2: I-90 Fixed-Guideway			
Alternative C2.1a: I-90 Fixed-Guideway, Downtown Seattle – Factoria – Issaquah/Bellevue – Kirkland/Redmond	0	4	2
Alternative C2.1b: I-90 Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	0	5	3
C3: Mid-Lake Fixed-Guideway			
Alternative C3.1a: Mid-Lake Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	2	1	2





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Fish-bearing streams and natural resources potentially affected, raising ESA or permitting issues:

- F1 - Foster Island/Montlake Cut Area
- F2 - Yarrow Bay Wetlands
- F3 - Kelsey Creek
- F4 - Sammamish River
- F5 - Bear Creek
- F6 - Mercer Slough

Historic properties with potential Section 106 and 4(f) issues:

- H1 - Mt. Baker Tunnel
- H2 - Historic property near Mt. Baker Tunnel
- H3 - Seattle Chinatown Historical District (National Register), International Special Review District
- H4 - Lake Union Steam Plant and Hydro House (Seattle Landmark)
- H7 - Historic property near station at 45th Street N in Wallingford
- H8 - Frederick W. Winters House (National Register)
- H9 - Pickering Farm (National Register)



Parks and trails potentially affected, raising 4(f) issues:

- P1 - 10th and Roanoke Park
- P2 - Bagley Viewpoint
- P3 - Washington Park and Arboretum
- P4 - SR 520 Trail
- P5 - Proposed BNRR Trail
- P5 - Proposed BNRR Trail (Cities of Bellevue and Kirkland)
- P6 - East Montlake Park
- P7 - Points Loop Trail
- P8 - Yarrow Bay Wetlands
- P11 - Madrona Park

**Figure 1-7
Environmental
Hot Spots**

Five of the alternatives (C1.1c, C1.1d, C1.2a, C1.2b, and C1.2c) would have the greatest impact to fish-bearing streams and wetlands by impacting the same five sensitive resources. Of particular concern are the construction impacts associated with the Foster Island/Montlake Cut habitat and wetlands, which is a priority habitat for threatened and endangered species (bald eagle and chinook salmon) and which provides high quality wetland habitat. None of the SR 520 crossing alternatives would be able to avoid this sensitive area.

All of the SR 520 crossing alternatives would require noise and vibration mitigation, but none was determined to result in such severe noise and vibration impacts that the impacts could not be mitigated.

Greater air quality impacts would generally be associated with the BRT alternatives (C1.2a, C1.2b, and C1.2c), due to the use of diesel buses, as opposed to high capacity transit on fixed-guideways.

Visual quality impacts would largely be associated with elevated or at-grade segments, which vary throughout the alternatives.

Other environmental criteria (land use, affected parcels, upland habitat, and neighborhoods) were found to not substantially differentiate at this level of alternatives definition. However, the alternatives that included the longer loops on the Seattle side (C1.1c and C1.1d, connecting the University District, Wallingford, Ballard, Fremont, etc.) had higher potential effects, while the more direct route to downtown (C1.2a and C1.2b) had the fewest. The Eastside segments showed little variety in impacts because similar connections were made in all alternatives.

Overall, Alternative C1.1b would have the fewest impacts to parks/trails, historic properties, and fish-bearing streams and wetlands. Alternatives C1.1d and C1.2b would have the greatest impacts to parks/trails, historic properties, and fish-bearing streams and wetlands.

C2: I-90 Crossing Alternatives

Two I-90 crossing alternatives were evaluated: Alternatives C2.1a and C2.1b. Alternative C2.1a would potentially impact four historic properties and two fish-bearing streams. Alternative C2.1b would have the same impacts but would also impact an additional historic resource (Frederick W. Winters House on Bellevue Way) and an additional fish-bearing stream (Mercer Slough). Mercer Slough is a primary rearing and holding area for chinook and other salmon, and contains high-quality wetlands that provide habitat for a wide variety of wildlife, including bald eagles. Impacts to Mercer Slough could be avoided by shifting the alignment to the west. Neither alternative would result in any direct impacts to parks/trails. Either alternative would require noise and vibration mitigation, but neither alternative would cause impacts so severe that they could not be mitigated.

Impacts to land use, neighborhoods, upland habitat, air quality and affected parcels do not differentiate the alternatives.



C3: Mid-Lake Crossing Alternatives

Only one alternative was evaluated for the Mid-Lake crossing (Alternative C3.1a). The alternative would directly impact two parks (Madrona Park and the proposed Burlington Northern Railroad Trail). Madrona Park impacts could possibly be avoided by modifying the location of the portal in Seattle. One historic resource was identified along the route (Seattle Chinatown Historical District). Two sensitive fish-bearing streams would be impacted by the alternative. In addition, construction impacts to Lake Washington shoreline habitat could be high depending on portal location for the lake crossing. Since a significant portion of the alternative is tunneled underground, visual quality impacts are avoided throughout much of the alignment.

Impacts to land use, neighborhoods, upland habitat, air quality and affected parcels do not differentiate the alternative.

Comparison of Corridors

Overall, the SR 520 crossing alternatives had the greatest impacts to the environment. Key resources impacted by the SR 520 crossing alternatives, but avoided by the Mid-Lake or I-90 alternatives, are the Washington Park and Arboretum and the Foster Island/Montlake Cut habitat and wetlands. Impacts to these resources would require an evaluation of avoidance alternatives and compliance with Section 4(f) of the U.S. Transportation Act, Endangered Species Act, and Section 404 of the Clean Water Act.

The I-90 crossing alternatives largely follow established transportation corridors, resulting in the fewest environmental impacts overall. The Mid-Lake crossing alternative would establish a new transportation corridor, but since much of the alternative is tunneled underground, many of the potential impacts are avoided. There would, however, be considerable construction impacts at the tunnel portals.

Each alternative crosses the Sammamish River and Bear Creek. Both waterways provide important habitat for chinook and other salmon species, and encroachment into the Sammamish River floodplain could reduce storage, increase erosion, and reduce water quality. These two resources do not differentiate the alternatives.

1.4 SUMMARY OF COST FINDINGS

The HCT alternatives under consideration had a substantial range of capital costs, with the I-90 routes (C2) having costs of \$2.6 to \$3.2 billion, the SR 520 (C1) routes with \$3.7 to \$5.2 billion, and Mid-lake (C3) routes having the highest costs. These costs tend to reflect a fully extended system with 22 to 32 miles of HCT facilities. In many cases, less lengthy system options would be possible, carrying lower costs. However, some additional segments, particularly with the SR 520 routes connecting to Seattle, would be required for feasible long-range HCT system operations.



Because the alternatives are still at a planning level of definition, the cost opinions were viewed comparatively rather than as an indicator of Trans-Lake HCT affordability. Costs are summarized in Table 1-4. The costs shown involve broad assumptions about the design requirements for the facility and for related features. They also include large factors for contingency. All of the alternatives have potential for substantially changed costs if the facility is defined differently, particularly in terms of how transit and highway facilities are combined in a corridor.

Table 1-4. Conceptual Capital Cost Estimates (Millions of 2001 Dollars)

Alternative	HCT Facility Capital Cost			HCT Operations Capital Cost		Total Capital Costs
	West Side	Lake Crossing	Eastside	Vehicles	Maintenance Base	
C1: SR 520 Fixed-Guideway						
Alternative C1.1a: SR 520 Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	\$740	\$190	\$2,420	\$300	\$140	\$3.8 Billion
Alternative C1.1b: SR 520 Fixed-Guideway, Downtown Seattle – U District – Bellevue – Kirkland/Redmond	\$1,840	\$190	\$2,420	\$340	\$140	\$4.9 Billion
Alternative C1.1c: SR 520 Fixed-Guideway, Downtown Seattle – U District – Kirkland/Redmond/Bellevue	\$1,840	\$190	\$1,890	\$330	\$150	\$4.4 Billion
Alternative C1.1d: SR 520 Fixed-Guideway, Downtown Seattle – Ballard – U District – Kirkland/Redmond/Bellevue	\$2,580	\$190	\$1,890	\$140	\$160	\$5.2 Billion
C1: SR 520 Bus Rapid Transit						
Alternative C1.2a: SR 520 BRT, Radial Service Pattern, Pacific Street Intercept	\$1,160	\$340	\$2,020	\$70	\$70	\$3.7 Billion
Alternative C1.2b: SR 520 BRT, Radial Service Pattern, Westlake Intercept	\$2,230	\$340	\$2,020	\$80	\$80	\$4.8 Billion
Alternative C1.2c: SR 520 BRT, Trunk/Feeder Service Pattern, Direct Routing through Downtown Seattle	\$1,630	\$340	\$2,020	\$70	\$70	\$4.1 Billion
C2: I-90 Fixed-Guideway						
Alternative C2.1a: I-90 Fixed-Guideway, Downtown Seattle – Factoria – Issaquah/Bellevue – Kirkland/Redmond	\$50	\$90	\$2,710	\$300	\$140	\$3.3 Billion
Alternative C2.1b: I-90 Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	\$50	\$90	\$2,090	\$260	\$140	\$2.7 Billion



Table 1-4. Conceptual Capital Costs Estimates (Millions of 2001 Dollars) (Continued)

Alternative	HCT Facility Capital Cost			HCT Operations Capital Cost		Total Capital Costs
	West Side	Lake Crossing	Eastside	Vehicles	Maintenance Base	
C3: Mid-Lake Fixed-Guideway						
Alternative C3.1a: Mid-Lake Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond	\$620	\$1,040 (Submerged Floating Tunnel) \$1,340 (Deep tunnel)	\$1,890	\$190	\$120	\$3.9 – 4.2 Billion

Descriptions are consistent with the “Draft detailed definition of Hot Alternatives” refer to this report if more detail is required. The BRT vehicles include 20% design contingency, which may not be necessary.

1.5 CONCLUSIONS

1.5.1 Alternative C1: HCT in the SR 520 Corridor

All of the SR 520 (C1) corridor alternatives involved similar transportation and environmental effects. Cost ranges were broader, but they tended to increase in proportion to the length of the system assumed, as well as the extent of the route that would be in tunnel. These cost differences could be reduced with other route combinations. Other conclusions:

- The BRT alternatives as defined for this evaluation with extensive SR 520 busways have similar transportation, environmental, and cost results as the fixed-guideway alternatives. The BRT alternatives overall had slightly higher peak ridership but lower daily ridership than the fixed-guideway alternatives across Lake Washington. However, all the SR 520 HCT alternatives were within 10 percent of each for Trans-Lake ridership and the SR 520 fixed-guideway alternatives with service between the University District and the Seattle Center had much higher total HCT ridership.
- Long-range system operations would likely require that connections be continued to downtown Seattle. This is true for any of the fixed-guideway and BRT routes. If a connection is made to the University District and the Central Link system, long-term system forecasts indicate that Central Link would not have the capacity to serve the total demand for travel to downtown Seattle without a parallel facility. However, a SR 520 system could be built initially from a transfer station in the University District to the Eastside, with the second connection to downtown Seattle provided when required by system extensions and ridership growth. If BRT is selected for the SR 520 corridor, provisions for the connection to downtown Seattle should be made in conjunction with highway improvements between Montlake and I-5, as it would be disruptive and difficult to add this segment at a later date.
- Intercepting the SR 520 busway at Westlake would cost \$700 million more than providing direct connections to downtown Seattle surface streets, without improving ridership. While the intercept station would help manage bus volumes in downtown Seattle, it would be more cost effective to operate a core set of SR 520 BRT routes, with local bus connections to these routes on the Eastside, University District, Montlake and in downtown Seattle. Utilizing this



trunk/feeder service pattern will provide frequent and efficient two-way service across the Lake, while managing bus volumes in congested urban centers. It may also be possible to further reduce downtown Seattle bus volumes by routing I-90 and SR 520 bus routes through downtown Seattle, if both have reliable two-way transit/HOV lanes across Lake Washington.

- Routing all Trans-Lake fixed-guideway transit through downtown Bellevue increases transit service within the Eastside without decreasing ridership from Overlake and Redmond and results in some increase in transit ridership across Lake Washington. However, a tunnel connection from SR 520 to Bellevue (via Clyde Hill) did not appear to offer significant improvements relative to the additional costs. The route option following SR 520 to the S. Kirkland park-and-ride lot and into the BNSF right-of-way would cost less and offer similar ridership, and its higher initial environmental effects (primarily to the Yarrow Bay wetlands) could be minimized by realigning the route. This option can be used as representative for further study, although other routes may ultimately be identified to provide the direct connection through Bellevue.
- The segment route options placing HCT in the SR 520 corridor between Bellevue and Overlake and on to Redmond can reasonably be used as representative alignments for further study. Although the Bel-Red Road and 148th Street routes would appear equally viable and may ultimately be preferred, the HCT routes following the shared SR 520 corridor would allow more consideration of the environmental effects of highway and transit improvements. No major differences were found in ridership between these route options.
- The segment route option extending the SR 520 Fixed Guideway to Ballard would result in much longer travel times from the Eastside to downtown Seattle and would not substantially improve ridership from Seattle to Eastside employment.
- The initial definition of BRT described a system with very similar characteristics to the fixed-guideways alternatives, including right-of-way required and the related costs and environmental impacts. However, BRT has the flexibility to share highway facilities such as HOV, while fixed-guideway routes do not. If the BRT alternative was revised to reduce the extent of exclusive busway, there is the potential to lower costs and environmental impacts while maintaining similar transit benefits, although reductions in travel times and reliability will probably result with shared facilities.

1.5.2 Alternative C2: HCT in the I-90 Corridor

Of the I-90 (C2) corridor alternatives, Alternative C2.1b had higher ridership but it also had higher natural resource environmental impacts as initially defined. However, if the alignment along S. Bellevue Way is modified, natural resource impacts could be avoided. The inclusion of an I-90 spur to Issaquah did not substantially affect ridership results. Although this HCT connection is feasible, the project team believes that bus connections between Issaquah and the I-90 fixed-guideway facility would deliver similar benefits well into the future. After reaching downtown Bellevue and crossing I-405, the I-90 routes could use the same SR 520 route options to Overlake and Redmond as the SR 520 routes above.



1.5.3 Alternative C3: HCT in a Mid-Lake Corridor

Although the Mid-lake Corridor would provide faster travel times between downtown Bellevue and downtown Seattle, its ridership results were in the same range as the C1 and C2 alternatives. Given the high costs of the alternative and its level of environmental impacts (both at the higher range of all alternatives), this alternative does not offer substantial advantages over the other two corridors. If the risk of using unproven floating submerged tunnel technology or boring at great depths under Lake Washington is considered, the alternative is even less promising.

1.6 RECOMMENDATIONS

All the HCT alternatives examined had a similar level of transportation performance, in terms of ridership across Lake Washington. This evaluation also found that the I-90 alternatives have fewer environmental impacts, but the evaluation does not yet account for the potential traffic impacts of placing light rail on I-90. Cost is the primary distinguishing factor between the alternatives.

The I-90 crossing has the lowest cost and fewest environmental impacts with similar transportation performance as the other alternatives and should be advanced for multi-modal evaluation.

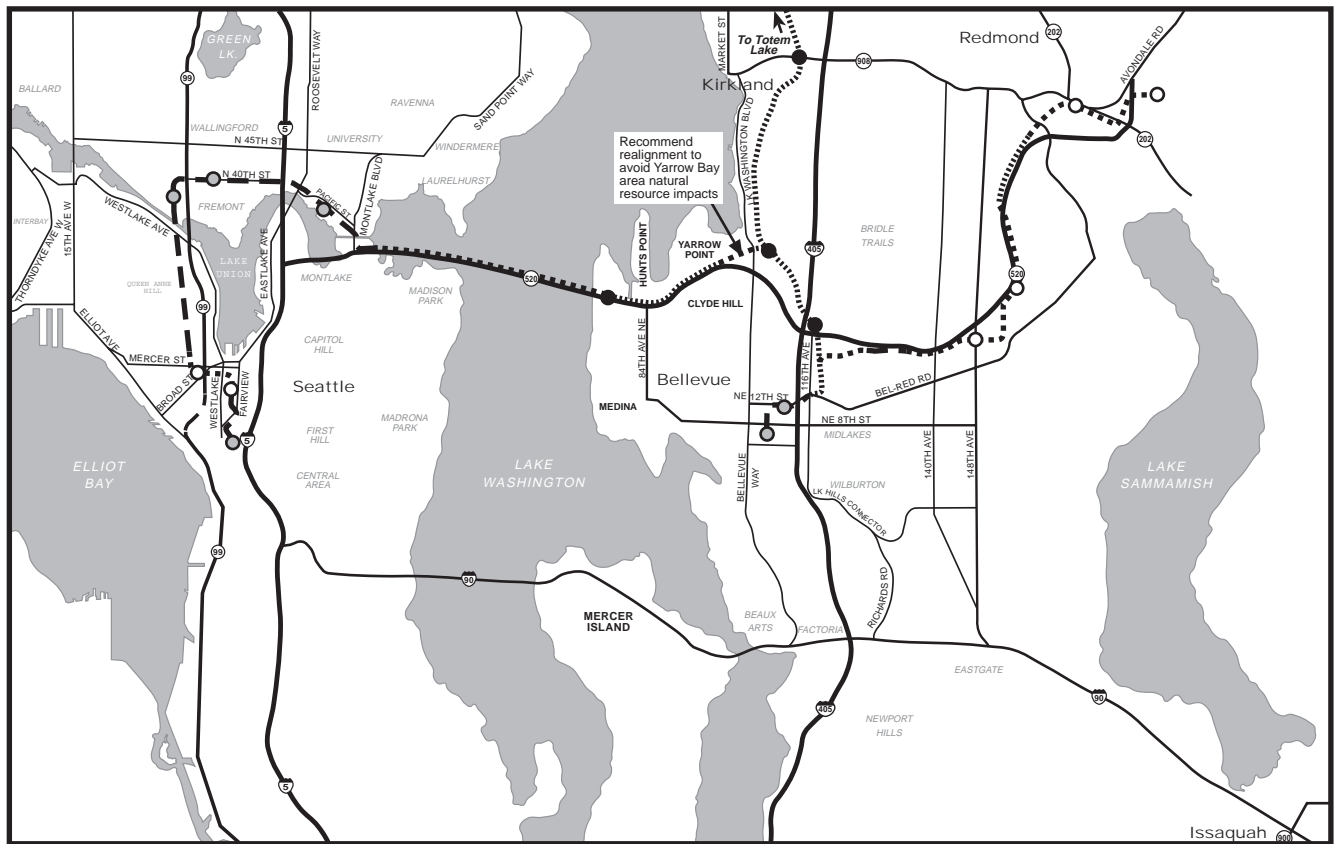
The costs of the SR 520 fixed-guideway alternatives are higher than the I-90 alternatives, due to the need for an additional corridor between the University District/Montlake area and downtown Seattle. However, this new corridor has the potential to be a very high ridership segment and could be deferred until required by system expansion and ridership. The SR 520 crossing also avoids potential traffic impacts on I-90 and should be advanced for multi-modal evaluation.

The costs of the SR 520 BRT alternatives are higher than the I-90 alternatives and similar to the SR 520 fixed-guideway costs. However, these costs could be lowered by reducing the extent of the busway and operating in HOV facilities. A SR 520 BRT alternative should be advanced for further evaluation.

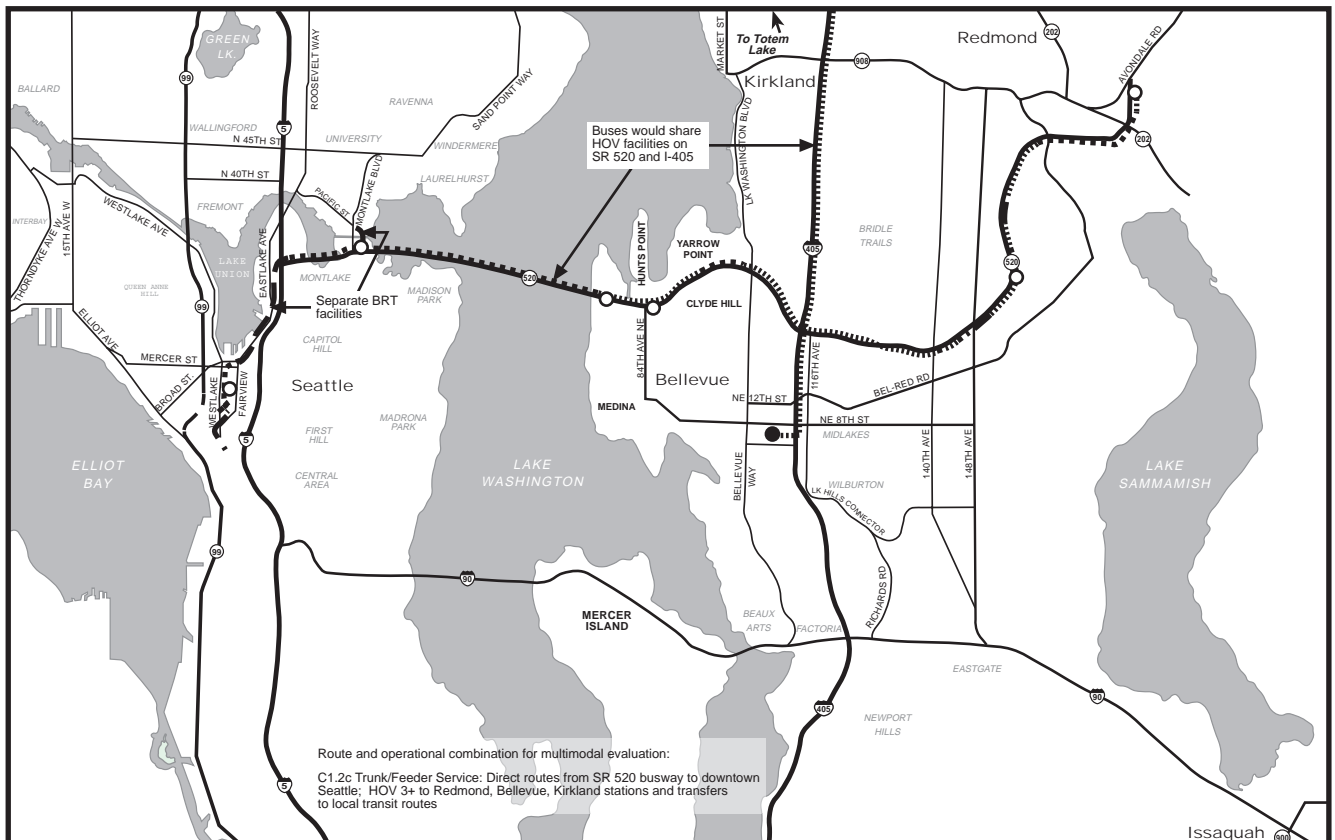
The cost of the Mid-Lake corridor is higher than the I-90 alternatives due to the cost of a tunnel crossing Lake Washington. Unlike the SR 520 alternatives, this additional cost does not result in increased ridership, as no new markets are served. The Mid-Lake corridor also has more environmental impacts than the I-90 alternatives; further evaluation is not recommended.

The range of HCT alternatives should be narrowed for multi-modal combinations, with representative route options selected for each corridor based on the results of modal evaluation. Further evaluation and optimization of route options on each side of the Lake would be conducted in a future project level analysis focused on the preferred lake crossing. The revised alternatives for multi-modal analysis are shown in Figures 1-8 and 1-9 and summarized below.





Proposed SR 520 Fixed Guideway Route
Downtown Seattle-U District-Kirkland/Redmond/Bellevue*
 *(For multimodal evaluation purpose, other routes could be used for future system planning.)



Trans-Lake Washington Project

130303PMX1F030901.fh8



Alignment

- Aerial
- Subway
- At Grade

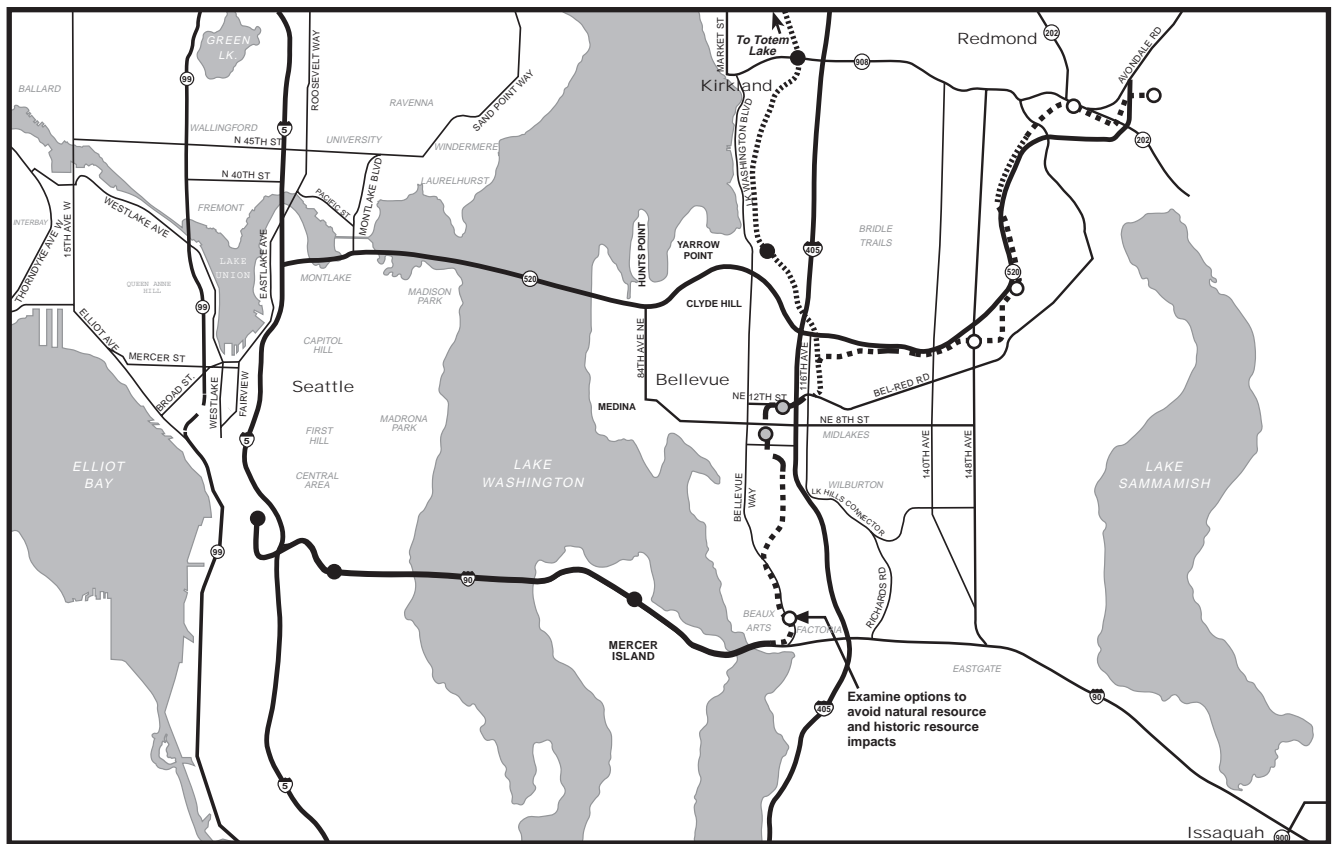
Station

-
-
-

Note: Short transition sections not shown

Proposed SR 520 Corridor
Bus Rapid Transit

Figure 1-8



**Proposed I-90 Fixed Guideway Route
Downtown Seattle-Bellevue-Kirkland/Redmond***
*(For multimodal evaluation purpose, other routes could be used for future system planning.)



Trans-Lake Washington Project

130303PMX1F030901.fh8



Alignment

- Aerial
- Subway
- At Grade

Station

-
-
-

Note: Short transition sections not shown

Figure 1-9

SR 520 Fixed-Guideway

The SR 520 fixed-guideway alternative C1.1: Downtown Seattle – University District – Kirkland/Redmond/Bellevue should be advanced to multi-modal screening, due to its potential high ridership segment between Westlake, Seattle Center, and the University District not served by SR 520 BRT or an I-90 crossing. The alternative should be realigned to avoid/mitigate environmental impacts near Yarrow Bay (see Figure 1-8).

SR 520 Bus Rapid Transit

In order to reduce costs and environmental impacts while maintaining similar levels of transit performance, the SR 520 BRT Alternative should share SR 520 HOV 3+ facilities across Lake Washington and make use of SR 520 and I-405 HOV direct access facilities on the Eastside. In Seattle, the BRT system should share the highway ramp from SR 520 to Pacific and Montlake in the University District, so long as that remains a viable option. The busway connection between SR 520 and downtown Seattle via South Lake Union should be further evaluated due to its ability to provide reliable two-way transit service to downtown while avoiding congestion in the I-5 express lanes. Trunk/feeder service appears to be a promising option for providing frequent and efficient two-way service across the Lake while managing bus volumes in congested urban centers. Design options to manage the HOV lanes and buffer them from general-purpose congestion should also be explored further (see Figure 1-8).

I-90

For the I-90 fixed-guideway alternative, Alternative C2.1b, which provides a faster connection to downtown Bellevue, Kirkland, and Redmond, should be used. The route should be realigned to avoid Mercer Slough area impacts and to share the SR 520 corridor east of I-405 to Redmond. Following the shared SR 520 corridor allows more consideration of the environmental effects of combined highway and transit improvements, without major changes in cost or ridership as compared to Bel-Red Road (see Figure 1-9).



ⁱ HCT Alternatives Considered

- No Build. Trans-Lake transit priority treatments would be the same as at present, with no change in the operation of the Interstate 90 (I-90) center roadway. Other transit priority treatments on the Eastside would include completion of high-occupancy vehicle (HOV) lanes and HOV direct access ramps on I-405.
- Alternative C1.1a: SR 520 Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond. A fixed-guideway would begin in Downtown Seattle at the Westlake Station, with platforms at a separate level below the Link Central Line platforms. It would pass through South Lake Union, tunnel under Capitol Hill and enter the SR 520 right-of-way near Portage Bay. The route would continue across Lake Washington along SR 520 to 84th Avenue NE, then turn to the southeast and enter a tunnel under Clyde Hill to Downtown Bellevue. East of Downtown Bellevue, the line would split into two branches. One branch would proceed north in the Burlington-Northern Santa Fe Railroad (BNSF) right-of-way through Kirkland to a terminus at Totem Lake. The other branch would proceed northeast along NE Bellevue-Redmond (Bel-Red) Road to the Overlake Transit Center, then proceed north along 148th Avenue NE to NE Redmond Way, turn east, enter the BNSF right-of-way, and continue past Redmond Town Center to a terminus near the Bear Creek Park-and-Ride.
- Alternative C1.1b: SR 520 Fixed-Guideway, Downtown Seattle – U District – Bellevue – Kirkland/Redmond. A fixed-guideway line would begin in Downtown Seattle at the Westlake Station, with platforms at a separate level below the Link Central Line platforms. The route would continue north to South Lake Union, turn east to the Seattle Center, then turn north in a tunnel under Queen Anne Hill and the Fremont Cut. The route would then head north through Fremont, turn east through Wallingford, and continue east along NE 40th Street to NE Pacific Street, crossing over the Link Central Line. At Montlake Boulevard NE, the alignment would turn south, cross under the Montlake Cut, and turn east into the SR 520 right-of-way. The alignment would continue across Lake Washington along SR 520 to 84th Avenue NE, then turn to the southeast and enter a tunnel under Clyde Hill to Downtown Bellevue. East of Downtown Bellevue, the line would split into two branches. One branch would proceed north in the BNSF right-of-way through Kirkland to a terminus at Totem Lake. The other branch would proceed northeast along NE Bellevue-Redmond (Bel-Red) Road to the Overlake Transit Center, then proceed north along 148th Avenue NE to NE Redmond Way, turn east, enter the BNSF right-of-way, and continue past Redmond Town Center to a terminus near the Bear Creek Park-and-Ride.
- Alternative C1.1c: SR 520 Fixed-Guideway, Downtown Seattle – U District – Kirkland/Redmond/Bellevue. A fixed-guideway line would begin in Downtown Seattle at the Westlake Station, with platforms at a separate level below the Link Central Line platforms. The route would continue north to South Lake Union, turn east to the Seattle Center, then turn north in a tunnel under Queen Anne Hill and the Fremont Cut. The line would continue north through Fremont, turn east through Wallingford, and continue east along NE 40th Street to NE Pacific Street, crossing over the Link Central Line. At Montlake Boulevard NE, the route would turn south, cross under the Montlake Cut, and turn east into the SR 520 right-of-way. The route would continue across Lake Washington along SR 520 then exit the SR 520 right-of-way near 96th Avenue NE and proceed to the South Kirkland Park-and-Ride. From the South Kirkland Park-and-Ride, the route would split into three branches. One branch would proceed north in the BNSF right-of-way through Kirkland to a terminus at Totem Lake. The other two branches would proceed southeast in the BNSF right-of-way. One branch would transition from the BNSF right-of-way into the SR 520 right-of-way heading east. This branch would exit the SR 520 right-of-way at NE 20th Street, continue via NE 20th Street and 156th Avenue NE to the Overlake Transit Center, rejoin the SR 520 right-of-way heading north to approximately the Sammamish River, then head northeast and enter the BNSF right-of-way, continue past Redmond Town Center to a terminus in the vicinity of the Bear Creek Park-and-Ride. The third branch would continue south from SR 520 in the BNSF right-of-way, then turn west under I-405, terminating in a tunnel under Downtown Bellevue.
- Alternative C1.1d: SR 520 Fixed-Guideway, Downtown Seattle – Ballard – U District – Kirkland/Redmond/Bellevue. A fixed-guideway line would begin in Downtown Seattle at the Westlake Station, with platforms at a separate level below the Link Central Line platforms. It would continue north to South Lake Union, turn east to the Seattle Center, and continue along West Mercer Street to Elliott Avenue West. The alignment would continue north through Interbay, cross Salmon Bay on an intermediate level movable bridge to Ballard, turn east through Phinney Ridge and Wallingford and continue east along NE 45th Street, crossing over the Link Central Line. At Montlake Boulevard NE, the alignment would turn south, cross under the Montlake Cut, and turn east into the SR 520 right-of-way. The alignment would continue across Lake Washington along SR 520, then exit the SR 520 right-of-way near 96th Avenue NE and proceed to the South Kirkland Park-and-Ride. From the South Kirkland Park-and-Ride, the alignment would split into three branches. One branch would proceed north in the BNSF right-of-way through Kirkland to a terminus at Totem Lake. The other two branches would



proceed southeast in the BNSF right-of-way. One branch would transition from the BNSF right-of-way into the SR 520 right-of-way heading east. This branch would exit the SR 520 right-of-way at NE 20th Street, continue via NE 20th Street and 156th Avenue NE to the Overlake Transit Center, then rejoin the SR 520 right-of-way heading north. The alignment would follow SR 520 to approximately the Sammamish River, then head northeast and enter the BNSF right-of-way, continue past Redmond Town Center to a terminus near the Bear Creek Park-and-Ride. The third branch would continue south from SR 520 in the BNSF right-of-way, then turn west under I-405, terminating in a tunnel under Downtown Bellevue.

- Alternative C1.2a: SR 520 BRT, Radial Service Pattern, Pacific Street Intercept. Exclusive bus lanes would be provided in the SR 520 right-of-way from Redmond to Montlake, extending to a bus terminal facility in the University District, adjacent to the Link Pacific Street Station, via a busway under the Montlake Cut and then along NE Pacific Street. There would also be a bus terminal facility at the International District Station, intercepting buses crossing Lake Washington via the I-90 two-way HOV lanes. On the Eastside, busway facilities would also extend north along the BNSF right-of-way to Downtown Kirkland and Totem Lake and south along the BNSF right-of-way to Downtown Bellevue, with a direct connection to the Bellevue Transit Center. Buses using these HCT facilities would operate in a radial service pattern. Routes would begin in Eastside neighborhoods or at Park-and-Rides then use the BRT facilities to reach the University District or Downtown Seattle intercept terminal. Patrons would complete their journeys by walking from the intercept facilities or by transferring to Link light rail or a local bus route at the intercept terminal.
- Alternative C1.2b: SR 520 BRT, Radial Service Pattern, Westlake Intercept. Exclusive bus lanes would be provided in the SR 520 right-of-way from Redmond to Montlake, then turning south and west under Capitol Hill to South Lake Union. The busway would continue from South Lake Union to a bus terminal facility adjacent to the Westlake Station. There would also be a bus terminal facility at the International District Station, intercepting buses crossing Lake Washington via the I-90 two-way HOV lanes. On the Eastside also would be busway facilities branching from SR 520 along the BNSF right-of-way to Downtown Bellevue and to Totem Lake. Buses using these HCT facilities would operate in a radial service pattern. Routes would begin in Eastside neighborhoods or at Park-and-Rides then use the BRT facilities to reach the Downtown Seattle intercept terminals. Patrons would complete their journeys by walking from the intercept facilities or by transferring to Link light rail or a local bus route at the intercept terminal.
- Alternative C1.2c: SR 520 BRT, Trunk/Feeder Service Pattern, Direct Routing through Downtown Seattle. Exclusive bus lanes would be in the SR 520 right-of-way from Redmond to Montlake, then turning south and west under Capitol Hill to South Lake Union. The busway would continue from South Lake Union to the Denny Regrade. In the Regrade, buses would enter onto 2nd, 3rd, and 4th Avenues for travel through the core of Downtown Seattle. Buses crossing Lake Washington via the I-90 two-way HOV lanes would also travel through Downtown Seattle on 2nd, 3rd, and 4th Avenues. On the Eastside also would be busway facilities branching from SR 520 along the BNSF right-of-way to Downtown Bellevue and to Totem Lake. Buses using these HCT facilities would operate in a trunk service pattern, serving various stations along the busways. Routes from Eastside neighborhoods or Park-and-Rides would provide feeder service to the BRT stations where patrons would transfer to BRT trunk routes to complete their journey.
- Alternative C2.1a: I-90 Fixed-Guideway, Downtown Seattle – Factoria – Issaquah/Bellevue – Kirkland/Redmond. A fixed-guideway line would begin in Downtown Seattle, splitting from the Link Central Line south of International District Station. From there the alignment would proceed east in the D-2 roadway to the I-90 center roadway, continuing across Lake Washington and Mercer Island. The alignment would cross the East Channel, then continue alongside the south side of I-90 across I-405 to Factoria. At Factoria, a branch line would continue east in the center of I-90 to Issaquah. The main line would head north along Richards Road to Wilburton and cross under I-405. Just south of Main Street, the alignment would transition to a tunnel configuration, crossing under Main Street and turning west under NE 2nd Street. At 106th Avenue NE, the alignment would turn north up to NE 12th Street. From there, the alignment would turn east, cross under I-405, and would split into two branches near the BNSF right-of-way. One branch would proceed north in the BNSF right-of-way through Kirkland to a terminus at Totem Lake. The other branch would proceed northeast along NE Bellevue-Redmond (Bel-Red) Road to the Overlake Transit Center, and then enter the SR 520 right-of-way heading north. The alignment would follow SR 520 to approximately the Sammamish River, then head northeast and enter the BNSF right-of-way, and continue past Redmond Town Center to a terminus in the vicinity of the Bear Creek Park-and-Ride.
- Alternative C2.1b: I-90 Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond. A fixed-guideway line would begin in Downtown Seattle, splitting from the Link Central Line south of International District Station. From there, the alignment would proceed east in the D-2 roadway to the I-90 center roadway, continuing across Lake Washington and Mercer Island. The alignment would cross the East Channel and turn onto Bellevue Way SE, continuing north along Bellevue Way SE and then along 112th Avenue SE. Just south of Main Street, the alignment would transition to a tunnel configuration, crossing under Main Street and turning west under NE 2nd Street. At 106th Avenue NE, the alignment would



turn north up to NE 12th Street. From there, the alignment would turn east, cross under I-405, and in the vicinity of the BNSF right-of way would split into two branches. One branch would proceed north in the BNSF right-of-way through Kirkland to a terminus at Totem Lake. The other branch would proceed northeast along NE Bellevue-Redmond (Bel-Red) Road to the Overlake Transit Center, and then enter the SR 520 right-of-way heading north. The alignment would follow SR 520 to approximately the Sammamish River, then head northeast and enter the BNSF right-of-way, continue past Redmond Town Center to a terminus near the Bear Creek Park-and-Ride.

- Alternative C3.1a: Mid-Lake Fixed-Guideway, Downtown Seattle – Bellevue – Kirkland/Redmond. A fixed-guideway line would begin in Downtown Seattle, splitting from the Link Central Line south of International District Station. From there the alignment would turn east under South Dearborn Street and continue east to Rainier Avenue South. The alignment would turn northeasterly in a deep-bored tunnel under the Central District and Madrona to meet the Mid-Lake crossing location near Howell Park. The alignment would continue across Lake Washington and tunnel under Medina into Downtown Bellevue. The alignment would continue along NE 4th Street, under I-405, turn north and cross under NE 8th Street and transition to at-grade configuration at the BNSF right-of way. The line would split into two branches. One branch would proceed north in the BNSF right-of-way through Kirkland to a terminus at Totem Lake. The other branch would proceed northeast along NE Bellevue-Redmond (Bel-Red) Road to the Overlake Transit Center, and then enter the SR 520 right-of-way heading north. The alignment would follow SR 520 to approximately the Sammamish River, then head northeast and enter the BNSF right-of-way, continue past Redmond Town Center to a terminus in the vicinity of the Bear Creek Park-and-Ride.

